



Scottsdale Road Corridor Drainage Master plan

March 2002



Study Purpose

The Flood Control District of Maricopa County (District) and the City of Scottsdale have formed a partnership to address regional drainage and flooding issues along the Scottsdale Road corridor. The Town of Paradise Valley and the City of Phoenix are also participating stakeholders in this study. The Scottsdale Road Corridor Drainage Master Plan (Scottsdale Road CDMP):

- identifies and evaluates existing regional drainage and flooding problems;
- considers neighborhood character and community recreational needs;
- identifies cost-effective drainage solutions that provide maximum community benefits; and
- involves the community and stakeholders in the development of the master plan.

The primary focus area of the Scottsdale Road CDMP is along the Scottsdale Road drainage corridor, the 71st Street Channel, and the upper portion of the Berneil Ditch in the Town of Paradise Valley (refer to Study Area Map). The overall study area encompasses those parts of Scottsdale, Phoenix, and Paradise Valley that drain storm runoff from the region to or through the primary focus area. The Scottsdale Road CDMP is intended to deal with drainage and flooding on a regional basis. It addresses the major drainage facilities that benefit and/or impact large areas of land. Individual municipalities usually address smaller, more localized drainage problems through municipal capital improvement projects without assistance from the District.

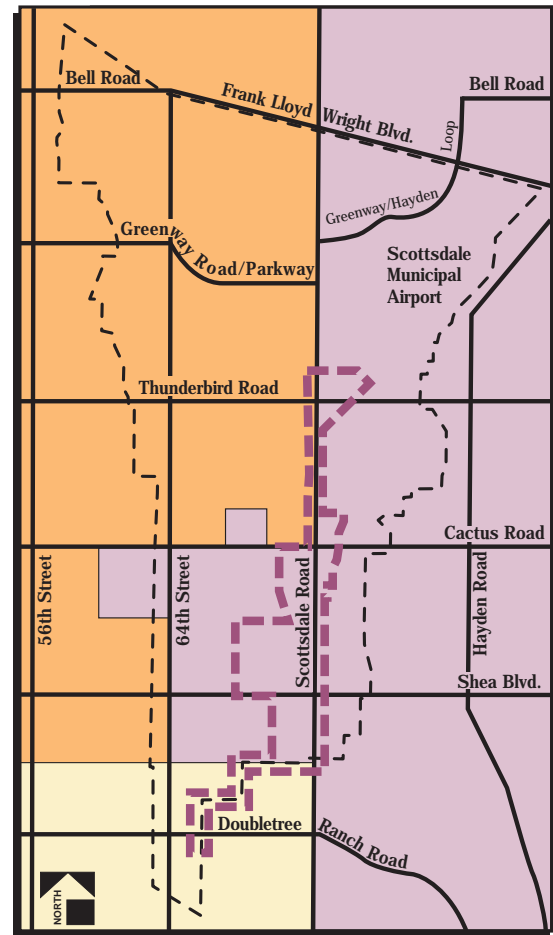
tonight's open house

The purpose of tonight's open house meeting is to:

- present the location and nature of the regional drainage and flooding problems in the focus area;
- provide information about the preliminary alternatives developed to reduce regional flooding in the focus area; and
- get your feedback, concerns, and comments regarding the alternatives.

Members of the Study Team are here to answer questions about the regional drainage problems that have been identified and the preliminary alternatives. Please take a moment to fill out the comment form that was provided with this handout. You may either leave it with us tonight or mail it to one of the contacts listed on the back of this handout. If possible, we would like your written comments by March 29, 2002.

Study AREA



key

Focus Area		Phoenix	
Study Area		Paradise Valley	
Scottsdale			



The Scottsdale Road CDMP Study Team held the first of three public involvement meetings on May 17, 2001, to introduce the study to the public and gather any issues and concerns the community had regarding flood control. Since that meeting, the data collection and existing condition analyses for the study have been completed and documented.

The Study Team held an all-day "brainstorming" meeting in September 2001 with stakeholders from the Cities of Scottsdale and Phoenix and the Town of Paradise Valley to formulate alternative solutions. All of

the potential preliminary alternatives generated from the brainstorming meeting were evaluated on the basis of their ability to meet the goals of the study as well as their construction cost, potential impacts to the community, and the opportunities that may be created from their implementation. Those preliminary alternatives that did not meet the majority of the evaluation criteria were eliminated from further consideration. The remaining preliminary alternatives that were not eliminated have been summarized here for your information.

STUDY AREA FLOOD PROBLEMS

The District, Cities of Scottsdale and Phoenix, and the Town of Paradise Valley have constructed several regional drainage facilities in the study area over the years (refer to map). These regional facilities include stormwater detention basins, drainage channels, and storm drains. In addition to the facilities constructed by the District and municipalities, many of the existing regional flood control facilities have been constructed as part of phased private residential and commercial development projects.

In the initial phase of the Scottsdale Road CDMP, the study area's drainage and all of its regional stormwater facilities were evaluated in a uniform, comprehensive way using current standards and criteria. When possible, this analysis was coupled with historic accounts of flooding and drainage problems in the study area. The results of this evaluation indicate that most of the regional facilities have a relatively high level of flood control. However, certain facilities represent "weak links" in the system and are not capable of controlling even minor storm runoff.

The existing drainage channel along the east side of Scottsdale Road from Sutton Drive to Sweetwater Avenue and the upper portion of the 71st Street Channel between Sunnyside Drive and Cholla Road represent weak links in the regional flood control system. These channels cannot convey as much flow as the drainage

facilities immediately above and below them. This condition contributes to drainage problems and flood hazards not only at these locations but also downstream from them. The 71st Street Channel crosses four roadways that do not have any culvert or storm drain to convey storm flows beneath them and at least two of the existing 71st Street Channel culverts do not have enough capacity in relation to the channels above and below them. The presence of an open drainage channel immediately next to a major street like Scottsdale Road poses a traffic hazard in both dry and storm conditions. The regional stormwater detention basins in Cactus and Mescal Parks and Berneil Ditch may overflow into adjacent neighborhoods during a major storm event because the basins and the pipes that drain them are not large enough.

The Scottsdale Road and 71st Street Channels, Cactus and Mescal Park detention basins, and Berneil Ditch are the existing regional flood control facilities that are the primary focus of the Scottsdale Road CDMP. This study has evaluated the regional facilities' flood control performance and has identified potential solutions to address their deficiencies. Wherever possible, these alternative solutions also considered the aesthetic character of the surrounding area and the multi-use recreational needs of the community in their planning and design.

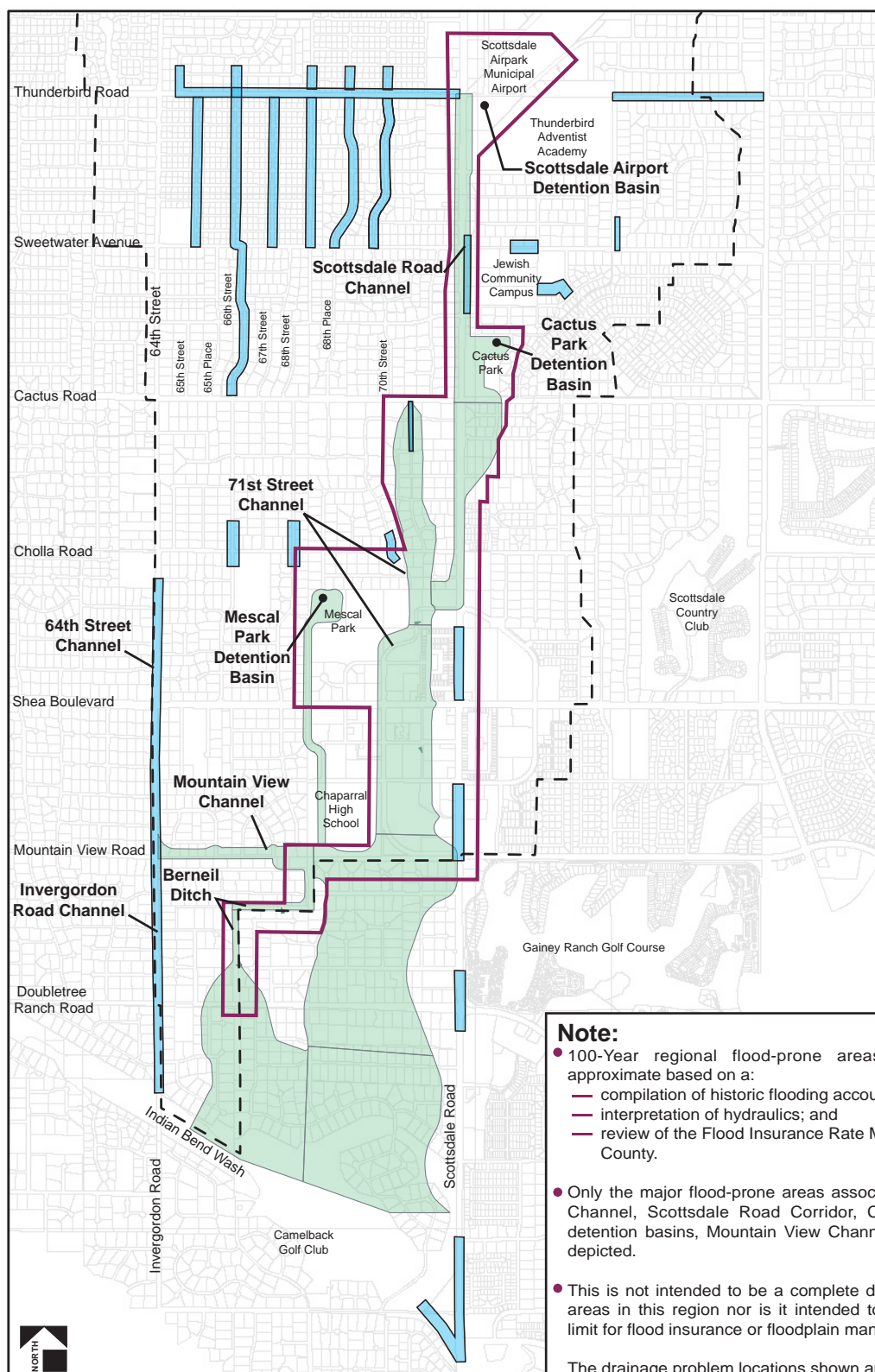


71st Street Channel Near Mescal Street



71st Street Channel Near Cholla Street

study Area Flood Problems



Note:

- 100-Year regional flood-prone areas shown on map are approximate based on a:
 - compilation of historic flooding accounts;
 - interpretation of hydraulics; and
 - review of the Flood Insurance Rate Map for Maricopa County.

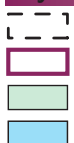
- Only the major flood-prone areas associated with the 71st Street Channel, Scottsdale Road Corridor, Cactus and Mescal Park detention basins, Mountain View Channel, and Berneil Ditch are depicted.

- This is not intended to be a complete depiction of all flood-prone areas in this region nor is it intended to establish any floodplain limit for flood insurance or floodplain management purposes.

The drainage problem locations shown are:

- approximated from the accounts of residents who attended the first public involvement meeting on May 17, 2002, and
- include both local and regional facilities.

Key



Study Area

Focus Area

Approximate 100-year Regional Flood-Prone Area

Approximate Drainage Problem Location

preliminary alternatives

One of the initial study objectives was to identify alternative solutions that would minimize flood damages from a 100-year storm, which is the normal level of protection used to design regional flood control facilities. A 100-year storm is an event that statistically has a one percent chance of occurring in any one given year. If protection from a 100-year storm could not be attained for reasons of cost, impact, available land, etc., then a 10-year level of protection could be used in the design of flood control facilities. A 10-year storm has a ten percent chance of occurring in a given year.

The rainfall totals for the 100- and 10-year storms are 3.2 and 2.0 inches, respectively. The rain is assumed to occur over the entire study area (almost ten square miles), and most of the rain would fall in a one or two hour period. The anticipated depth of flooding next to regional drainage facilities that are not capable of controlling the 100- or 10-year flood will vary but is typically on the order of one or two feet (or less). Because flooding in this study area is typically shallow, there may not be a noticeable difference between a 100-year and a 10-year storm in the amount of land area that is flooded.

Two of the preliminary alternatives were developed to target only those regional facilities in the focus area that presently do not provide the 100- or 10-year storm levels of protection. The Red Alternative was developed to provide the 100-year storm flood protection, and the Orange Alternative was developed for the 10-year level of protection.

Two other alternatives were formulated with the simple goal of improving the existing regional drainage system to reduce the most significant flood hazards. The Yellow Alternative was designed to provide improved flood control with a low impact on the community in terms of property acquisitions and drainage easements. The Green Alternative was based on a minimum standard of design for regional flood control facilities with the least amount of property acquisitions or drainage easements required. In places, the Yellow and Green alternatives provide less than a 100-year or 10-year level of protection.

While these four alternatives represent traditional structural approaches to flood control, the Blue Alternative is a non-structural alternative that also warrants consideration. A non-structural solution addresses drainage concerns without any physical modifications/improvements within the study area. Examples of non-structural implementation include public education, flood insurance, and flood warning systems. If structural alternative solutions that would not control a 100-year storm are chosen, it is possible that the regional flood-prone areas may be mapped in the future and that flood insurance may be required within these flood-prone areas.



Scottsdale Road Channel



71st Street Channel



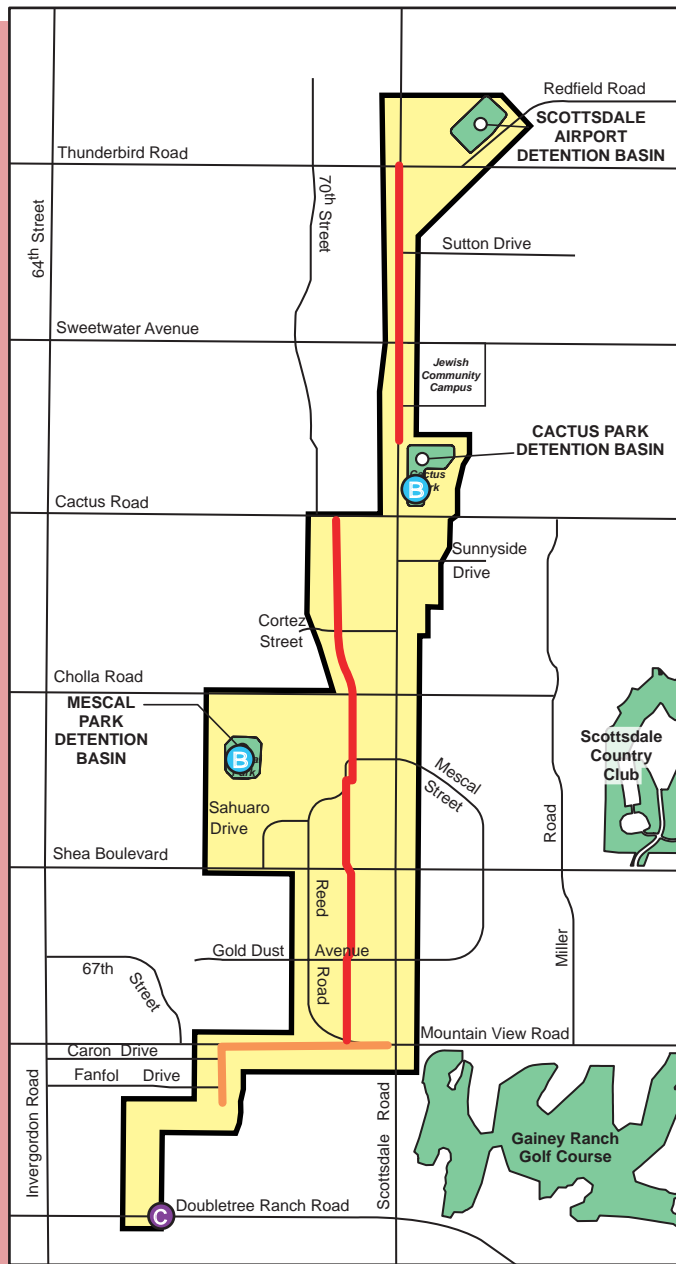
Cactus Park Detention Basin



Mescal Park Detention Basin



Berneil Ditch



Key

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Focus Area | B Proposed Basin Improvement |
| Parks/Recreation | Proposed Channel Improvement |
| Proposed Pipe/Box | C Proposed Culvert Improvement |

RED Alternative - 100-Year Structural Solution



Example of Hard-Surfaced Spillway



Example of Turfed Spillway



Example of Concrete Box Culvert



Example of Storm Drain Inlet

Comparison of preliminary alternatives

Description	Red Alternative	Orange Alternative
Level of Protection	<ul style="list-style-type: none"> 100- year. 	<ul style="list-style-type: none"> 10-year.
Scottsdale Road Channel	<ul style="list-style-type: none"> Construct an additional underground storm drain south of Sweetwater Avenue. Extend existing underground storm drain north of Sweetwater Avenue. 	<ul style="list-style-type: none"> Extends existing underground storm drain north of Sweetwater Avenue.
71st Street Channel	<ul style="list-style-type: none"> Constructs new underground storm drain from Cactus Road to the Berneil Ditch. 	<ul style="list-style-type: none"> Constructs new underground storm drain from Cactus Road to Cholla Road. Enlarges existing surface channel between Sahuaro Drive and Mescal Street. Reconstructs culvert crossings at Cochise Road and Sahuaro Drive.
Cactus Park Detention Basin	<ul style="list-style-type: none"> Raises existing emergency spillway. Adds additional outlet pipe. 	<ul style="list-style-type: none"> No improvements proposed.
Mescal Park Detention Basin	<ul style="list-style-type: none"> Constructs new emergency spillway. Enlarges basin capacity. 	<ul style="list-style-type: none"> No improvements proposed.
Berneil Ditch	<ul style="list-style-type: none"> Enlarges existing channel for 0.75 mile. Moves access/multi-use road to channel bottom. Constructs 1-to-2-foot-high flood wall. Increases capacity at Doubletree Ranch Road culvert crossing. 	<ul style="list-style-type: none"> Enlarges existing channel for 0.75 mile. Moves access/multi-use road to channel bottom. Constructs 1-to-2-foot-high flood wall.
Properties Directly Impacted	<ul style="list-style-type: none"> 84 parcels. 	<ul style="list-style-type: none"> 56 parcels.
Stormwater Contained Within Scottsdale Road Right-of-way	<ul style="list-style-type: none"> Yes. 	<ul style="list-style-type: none"> Yes.
Improves Driver Safety Along Scottsdale Road	<ul style="list-style-type: none"> Yes. 	<ul style="list-style-type: none"> Yes.
Construction Impacts to Parks	<ul style="list-style-type: none"> Minimal at Cactus Park. May require temporary closure of Mescal Park. 	<ul style="list-style-type: none"> None.
Permanent Impacts to Multi-use Facilities	<ul style="list-style-type: none"> Trail at Mescal Park moves to bottom of basin. Trail along Berneil Ditch moves to bottom of channel. 	<ul style="list-style-type: none"> Trail along Berneil Ditch moves to bottom of channel.
Reduces Ponding in Parks	<ul style="list-style-type: none"> Yes. 	<ul style="list-style-type: none"> No.
Multi-use Opportunities	<ul style="list-style-type: none"> High. 	<ul style="list-style-type: none"> Moderate.
Aesthetic Improvement Opportunities	<ul style="list-style-type: none"> High. 	<ul style="list-style-type: none"> Moderate.
Traffic Impacts During Construction	<ul style="list-style-type: none"> High. 	<ul style="list-style-type: none"> Moderate.
Cost	\$41.05 - 45.16 million	\$10.36 - 11.40 million

Yellow Alternative	Green Alternative	Blue Alternative
<ul style="list-style-type: none"> Nearly 10-year. 	<ul style="list-style-type: none"> Higher level than existing. 	<ul style="list-style-type: none"> No added protection.
<ul style="list-style-type: none"> Extends existing underground storm drain north of Sweetwater Avenue. 	<ul style="list-style-type: none"> No improvements proposed. 	<ul style="list-style-type: none"> No improvements.
<ul style="list-style-type: none"> Constructs new underground storm drain from Sunnyside Drive to a section of Cholla Road. 	<ul style="list-style-type: none"> Constructs new underground storm drain from Sunnyside Drive to south of Cholla Road. 	<ul style="list-style-type: none"> No improvements.
<ul style="list-style-type: none"> Raises existing emergency spillway. Adds additional outlet pipe. 	<ul style="list-style-type: none"> Raises existing emergency spillway. 	<ul style="list-style-type: none"> No improvements.
<ul style="list-style-type: none"> Constructs new emergency spillway. 	<ul style="list-style-type: none"> Constructs new emergency spillway. 	<ul style="list-style-type: none"> No improvements.
<ul style="list-style-type: none"> Enlarges existing channel for 0.5 mile. Moves access/multi-use road to channel bottom. 	<ul style="list-style-type: none"> Enlarges existing channel for 0.5 mile. 	<ul style="list-style-type: none"> No improvements.
<ul style="list-style-type: none"> 26 parcels. 	<ul style="list-style-type: none"> 25 parcels. 	<ul style="list-style-type: none"> None.
<ul style="list-style-type: none"> No. 	<ul style="list-style-type: none"> No. 	<ul style="list-style-type: none"> No.
<ul style="list-style-type: none"> Yes. 	<ul style="list-style-type: none"> No. 	<ul style="list-style-type: none"> No.
<ul style="list-style-type: none"> Minimal at both Cactus and Mescal Parks. 	<ul style="list-style-type: none"> Minimal at both Cactus and Mescal Parks. 	<ul style="list-style-type: none"> None.
<ul style="list-style-type: none"> Trail along Berneil Ditch moves to bottom of channel. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None.
<ul style="list-style-type: none"> Yes. 	<ul style="list-style-type: none"> No. 	<ul style="list-style-type: none"> No.
<ul style="list-style-type: none"> Low. 	<ul style="list-style-type: none"> Low. 	<ul style="list-style-type: none"> None.
<ul style="list-style-type: none"> Low. 	<ul style="list-style-type: none"> Low. 	<ul style="list-style-type: none"> None.
<ul style="list-style-type: none"> Moderate. 	<ul style="list-style-type: none"> Low. 	<ul style="list-style-type: none"> None.
\$6.54 - 7.20 million	\$3.89 - 4.29 million	No structural costs

Glossary

Catch Basin - A chamber or well, usually built at the gutter line of a street or other flow path, for the inlet of surface stormwater into a storm drain.

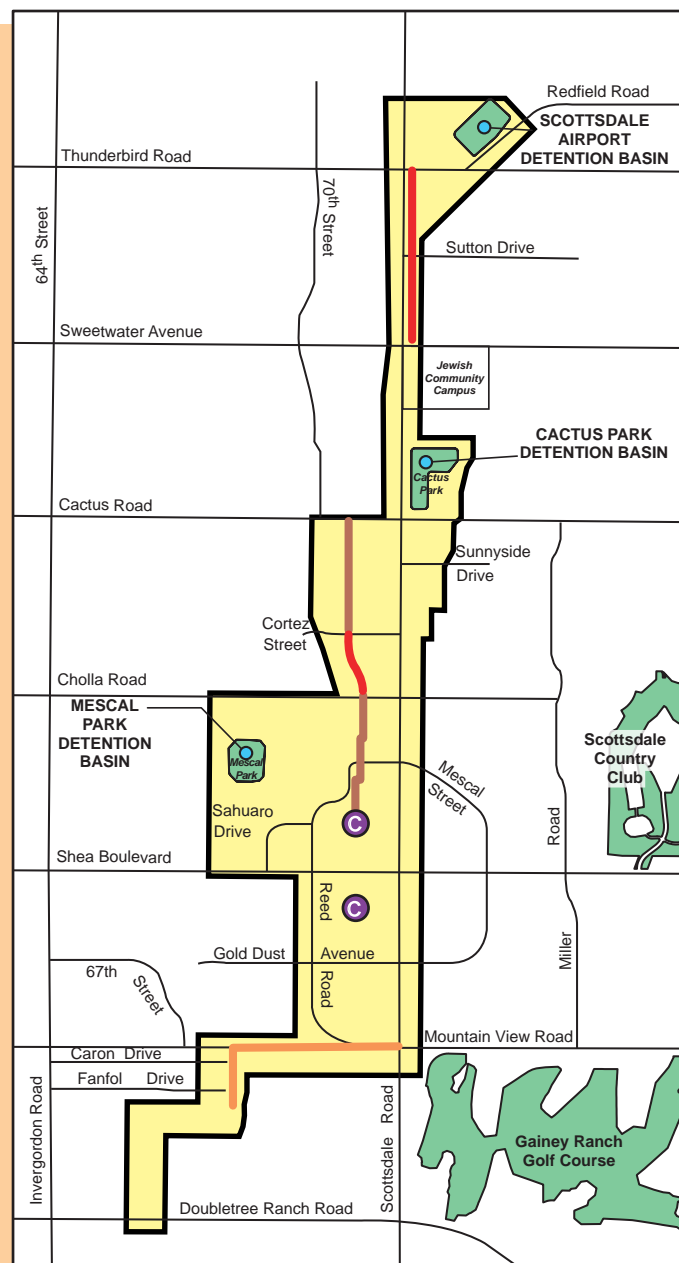
Channel - An open conveyance of surface stormwater having a bottom and sides in a linear configuration. Channels can be natural or man-made. Channels can have levees or dikes along their sides to build up their depth. Constructed channels can be plain earth, landscaped, or lined with concrete, stone, or other hard surface to resist erosion and scour.

Culvert - A relatively short conduit that conveys surface stormwater through a raised embankment or under a roadway from one side to the other. Culverts can have single or multiple barrels and can consist of concrete, metal, or plastic pipe or reinforced concrete box structures.

Detention Basin - A basin or reservoir that holds stormwater to reduce the flow rate of runoff downstream. Typically, a detention basin has a primary outlet consisting of a pipe near its bottom and an emergency spillway near its top. A detention basin can be excavated below ground or built up above ground with an earth dike or concrete dam.

Emergency Spillway - A structural feature of a detention basin that provides for the safe overflow of floodwaters during large storms that exceed the design capacity of the basin's primary outlet. The emergency spillway also operates in the event that the primary outlet becomes obstructed. The emergency spillway prevents storm flows from damaging the facility which could cause its failure.

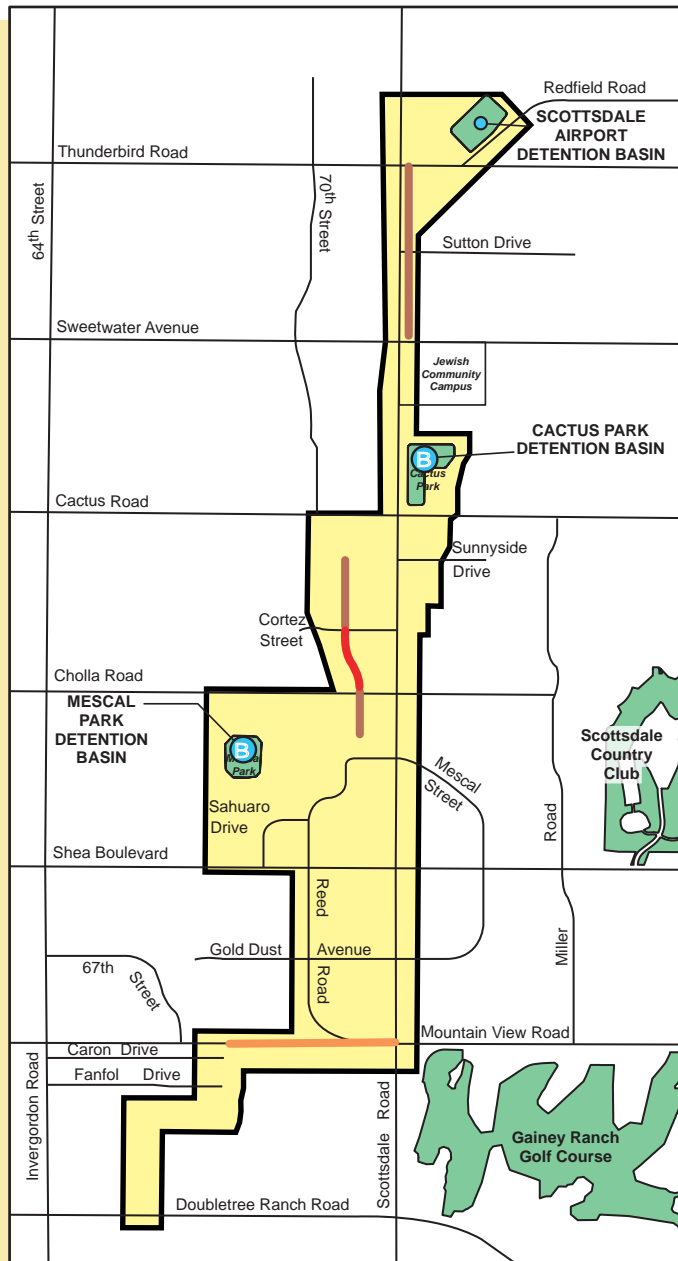
Flood Control - Various activities and regulations that help reduce or prevent damages caused by flooding. Typical flood control activities include: structural flood control works (such as bank stabilization, levees, detention basins, and drainage channels), acquisition of flood-prone land, flood insurance programs and studies, river and basin management plans, public education programs, and flood warning and emergency preparedness activities.



Key

- Focus Area
- Parks/Recreation
- Proposed Pipe/Box
- Proposed Channel Improvement
- C Proposed Culvert Improvement
- Proposed Box & Channel

ORANGE Alternative - 10-Year Structural Solution



Key

- Focus Area
- Parks/Recreation
- Proposed Pipe
- Proposed Pipe & Channel
- Proposed Channel Improvement
- E Proposed Basin Improvement

YELLOW Alternative - Low-Impact Structural Solution

Floodwall - An above-ground man-made structure usually situated along the bank of a channel to provide extra conveyance capacity. Floodwalls can be of varying height and length and are usually made of reinforced concrete or masonry block in such a way as to resist the force of the stormwater they are designed to control.

Low Flow Channel - A smaller channel within a larger channel that typically conveys the minor, more common low flows and nuisance flows.

Multi-Use Flood Control Facility - A flood control facility such as a channel, detention basin, or retention basin that provides other beneficial uses in addition to its primary flood control function. Such benefits include recreation, parking, visual buffers, or water harvesting.

Retention Basin - A basin or reservoir that holds stormwater to reduce the volume or flow rate of runoff downstream. Similar to a detention basin except for the primary outlet. A retention basin typically either has no primary outlet pipe so the stormwater must be disposed of by draining into the soil and by evaporation, or the outlet pipe is so small that it takes several hours after the storm has subsided to bleed off the stormwater. Like detention basins, retention basins also need an emergency spillway near their top to conduct their excess flows.

Runoff - That portion of precipitation that does not soak into the ground or that is not trapped in shallow depressions. Runoff accumulates on the ground surface and ultimately reaches streams, channels, storm drains, and basins.

Storm Drain - A closed conduit, typically underground, that conveys stormwater for some distance. Storm drains may be constructed of concrete, metal or plastic pipe. Larger storm drains are often reinforced concrete box structures. A storm drain system may include inlets (catch basins), manholes, and an energy dissipater at its outlet.

Trash Rack - A metal bar or grate located at the outlet structure of a detention or retention basin which is designed to prevent blockage of the structure by debris.



Example of Detention Basin



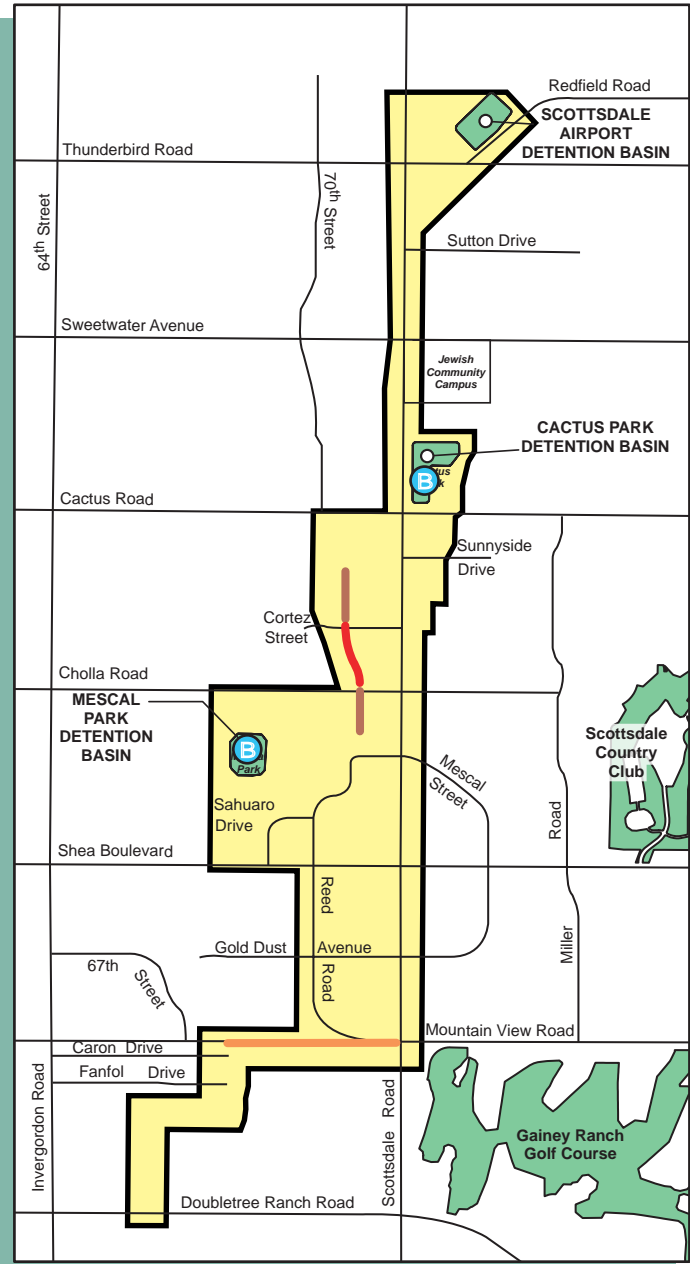
Example of Hard-Surfaced Channel



Example of Landscaped Channel



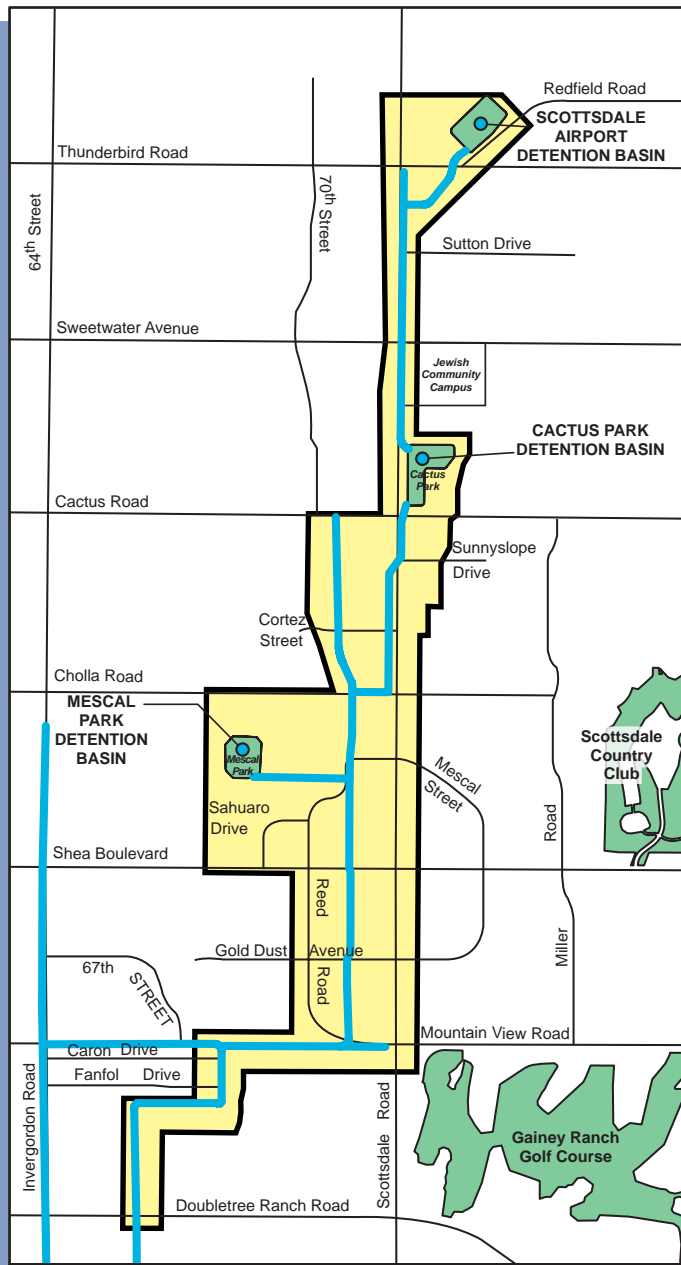
Example of Inlet with Trash Rack



Key

- Focus Area
- Parks/Recreation
- Proposed Pipe
- Proposed Channel Improvement
- B Proposed Basin Improvement
- Proposed Pipe & Channel

GREEN Alternative - Minimal Structural Solution



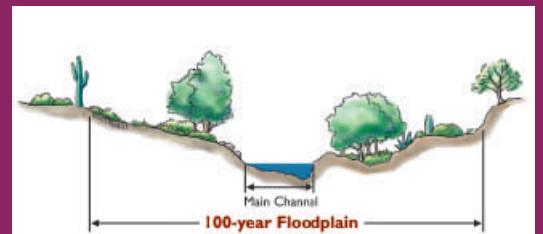
Key

- Focus Area
- Parks/Recreation
- Regional Drainage Facility

BLUE Alternative - Non-Structural Solution



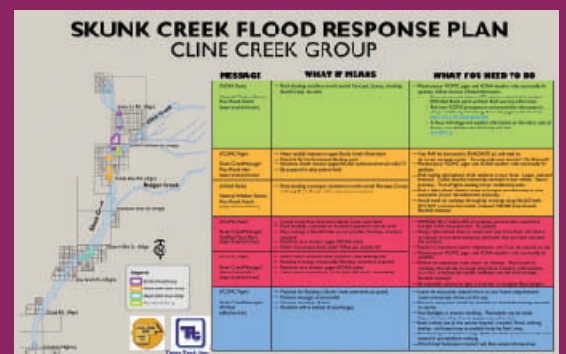
Example of Floodplain Delineation



Conceptual Section of 100-year Floodplain



Example of Flood Warning Plan



Example of Response Plan

next steps

The feedback from the March 2002 open house will be combined with the input and direction received from the study's stakeholders to formulate the preferred alternative. The preferred alternative could be any one of the five preliminary alternatives or it could be a combination of the most desirable features selected from each alternative. We would like your opinion on the alternatives and on prioritizing the evaluation criteria provided in tonight's comment sheet. If possible, we would like your written comment by **March 29, 2002**. The preferred alternative will be more closely evaluated in the next step of the study. The Study Team will present the preferred alternative at the third and final public meeting scheduled for June 2002.

Study Schedule	2001											2002						
	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Data Collection																		
Environmental Considerations																		
Alternatives Development																		
Alternatives Evaluation																		
Recommended Alternative(s)																		
Implementation Plan																		
Public Involvement																		

● = Public Meetings

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The Flood Control District of Maricopa County has a web site for this project with routinely updated information. Please visit us at: www.scottsdaleroadCDMP.com